have yet to learn how far these atmospheric movements were connected with or independent of the eruption.

There are some excellent geologists in New Zealand who have now a rare opportunity of investigation. No mud-eruptions at all comparable in magnitude to those of this summer in New Zealand have ever been known. The connection of these with the explosion of Tarawera, the relation of the latter to the lava-reservoir inside, the nature of the so-called "flames" and "pillar of fire" so conspicuous on the night of the eruption, the sources of the "fire-balls," and many other details, offer a wide and most interesting field for the colonial observers. Geologists all over the world will await with much interest the publication of their investigations. ARCH. GEIKIE

NOTES

THE honour of knighthood has been conferred on Mr. Philip Magnus, the head of the City and Guilds Technical Institute at South Kensington.

LAST Saturday a banquet was given to M. Chevreul by French students to celebrate the one hundredth anniversary of his birth.

THE death is reported on June 22 of Dr. H. F. Hance at Amoy, at which place he was Her Majesty's consul. Although no independent work bears Dr. Hance's name, he has done more than any other man to make us acquainted with the flora of China, both of the empire and of the British colonies. His contributions to botanical literature are to be found in periodicals, very largely in Trimen's *Journal of Botany;* and the number of species described by him for the first time is very great. He was a contributor to the herbaria at the British Museum and at Kew. It is to be hoped that his herbarium will be brought to London and deposited where it can be consulted, and his types readily compared with those of other authors. A full synonymic catalogue of all the known Chinese plants is now in course of publication by Messrs. Forbes and Hemsley, and is greatly needed.

UNDER the energetic management of Dr. Adolph Bastian the Administration of the Berlin Royal Ethnological Museum has commenced to publish a series of original communications explanatory of the varied contents of that superb collection. According to the present programme four parts of about 60 large octavo pages each, with two or more plates of illustrations, will be issued yearly by the Berlin publisher, W. Spemann, at the price of 16 marks, or 4 marks each. Judging from the three parts, which have already appeared for the year 1885–86, the series promises to develop into a vast encyclopædia of anthropological subjects. Many of the communications constitute in themselves more or less exhaustive essays on special branches of ethnology, and to some of them a peculiar value attaches, because contributed by the collectors or observers themselves. Such, for instance, is the paper on funeral rites in the Pellew Islands, contributed to the first number by the traveller, Kubary, who has spent many years in the Oceanic regions, and made a special study of the Polynesian and Micronesian islanders. The same number contains a report on Richard Rohde's expedition to the Paraguay and Brazil (Matto Grosso) in 1883–84, followed by the traveller's account of the Bororo and Guato tribes in the Upper Paraguay basin. Of great value is Dr. O. Finsch's paper in Part II. on the ethnological collections from the South Sea Islands, some 3000 objects, of which more than half found their way to the Berlin Museum. The importance of securing specimens from this region before it is too late is well shown by the experience of this traveller, who on revisiting New Britain in 1884–85 was no longer able to procure several objects which were readily obtainable three years previously. Others, such as wood-carvings, are now "manufactured" in New Ireland "for the trade," the natives finding good customers amongst the crews of passing ships. This paper is followed by the explorer Grabowski's description of nearly 200 objects from South and East Borneo, many extremely rare, if not quite unique. Dr. Bastian concludes a characteristic essay at the end of Part III. with the words: "So walte ein Jeder seines Amtes,—und uns ist die Aufgabe zugefallen,—Das rechtzeitig in Sicherheit zu bringen, was morgen schon verloren sein mag."

IN the July number of the *American Journal of Science*, Prof. Rockwood, jun., of Princeton, publishes a paper (the fifteenth of the series) on the earthquakes of North and South America for the year 1885. The writer again attempts to assign to each earthquake a grade of intensity, based where possible upon the character of the physical phenomena reported. Where no such information was available the estimate is based on the phraseology of the original report, taking into account the probable intensity of an earthquake in the locality in question. There is, as Prof. Rockwood recognises, a large element of uncertainty in these estimates, "but at least they are the best that can be made now, and better than any one else could make at a later date and without access to the original reports." This last consideration alone appears to us to justify the attempted classification. A large proportion of the American earthquakes of the year occurred in California, and accordingly a small outline earthquake map of that State for the year is given. The whole list contains 71 items: 34 belong to the Pacific coast of the United States, 9 to the Atlantic States, 8 to the Canadian provinces, 5 to New England, 3 to the Mississippi valley, 5 to South and 2 to Central America.

WE may also take this opportunity of referring to the same writer's annual account of the progress in vulcanology and seismology for 1885, published in the Smithsonian Report. Most of the incidents recorded, and papers and other publications referred to have from time to time been described or reported in our own columns, and it is therefore only necessary to say that in this as in previous years the summary shows great care and industry, and should be an invaluable *vade mecum* to all interested in the study of these phenomena.

THE United States Commissioners are still continuing their labours in the direction of acclimatising flatfish to American waters, which are nearly as well suited to the *Pleuronectidæ* as English waters. Several attempts have been made to transmit them from our shores alive, but hitherto with little success. Information has, however, reached us to the effect that fifty soles during last month were sent by the Derby Museum authorities at Liverpool, twenty-five of which reached their destination alive. Prof. Baird, the Chief Commissioner, states that the fish are in a thriving condition and feed well. They have been placed in a suitable habitat at Washington Station, and are being watched with special care. The soles, which are about three inches long, were transmitted in glass globes attached to the ceiling of the cabin of the s.s. *Britannic*. This method minimises the risk of injury to the fish through the oscillation of the vessel, as the receptacles, being swung, move backwards and forwards with the motion of the steamer. The National Fish Culture Association intend forwarding to America another consignment of flatfish next month in order to assist the operations of the Commissioners. The sole is a very delicate fish, and cannot withstand the strain of protracted journeys, which makes it very difficult to transmit.

MESSRS. J. B. LIPPINCOTT AND CO. have in the press a "Manual of North American Birds," by the eminent ornithologist, Prof. Robert Ridgway, Curator of the Department of Birds, Smithsonian Institution, Washington, D.C. The author has had exceptional advantages for the preparation of a treatise of this character, arising from his own field experience, as well as his connection with the National Museum, and the free access which has been granted him to various other public and private collections of birds, both in this country and Europe. The work is to contain some 425 illustrations suitably executed, and will conform to the geographical limits, classification, numeration, and nomenclature adopted by the American Ornithological Union.

ACCORDING to an official notification of the trustees of the "Schwestern Fröhlich Stiftung" at Vienna certain donations and pensions will be granted from the funds of this charity this year in accordance with the will of the testatrix, Miss Anna Fröhlich, to deserving persons of talent who have distinguished themselves in any of the branches of science, art, or literature, who may be in want of pecuniary support either through accident, illness, or infirmity consequent upon old age. The grant of such temporary or permanent assistance in the form of donations or pensions is, according to the terms of the foundation deed, primarily intended for Austrian artists, literary men and men of science, but in which however foreigners of every nationality—English and others—may likewise participate provided they are resident in Austria. Donations will be granted to artists and men of letters and science for the purpose of completing their studies, and for the execution or publication of a certain specific work, and also in cases of sudden inability to work. Pensions are being granted to artists and men of letters and science who, in consequence of old age, illness, or other misfortunes, have been placed in a position of want. The applications addressed to the trustees (das curatorium) must be transmitted to the president's office of the Common Council of the City of Vienna (an das Präsidial-Bureau des Wiener Gemeinderathes Neues Rathhaus) before August 31, 1886, through the Austro-Hungarian Embassy in London, 18, Belgrave Square, S.W., where also further particulars of the terms and conditions of the foundation deeds, &c., can be obtained.

THE fifth Circular of Information for 1885, published by the United States Bureau of Education, is a very exhaustive treatise upon physical education. It directs attention to the four different ideas of manly excellence: the Greek, or æsthetic; the monkish, or ascetic; the military, or knightly; and the medical, or scientific. The recent war popularised the third in America, and reports of work of that class are accordingly to be found here. The teachings of the fourth, down to the most recent day, are of course the essence of the paper, and more than once attention is called to the great tendency of such teaching to return to the old standards of the first. In England, and still more in America, the oldest colleges and schools were founded with the principal object of educating a clergy, and accordingly were imbued with the spirit of the second—an important result of which has been that the games which occupy so much of the thoughts and the time of the students have hardly ever been recognised by the authorities, who have quite recently been forced to take them under their control to prevent abuse. It is felt now how important it is that games and exercises should be supervised and made a part of education, to be carefully controlled by a competent M.D., who shall be one of the Faculty on a par with the other masters. Rugby football is condemned by the great Harvard University as a "brutal and dangerous" game. Many strong objections to much that attends public games are recounted, and many careful restrictions on games generally have been agreed to by the highest authorities, both scholastic and medical. The code and the books of Mr. Maclaren, of Oxford—a prophet too little honoured in his own country—are highly praised, but Germany carries the palm for science and laborious thoroughness. The manual labour which has been so successful in the lower-grade schools is naturally not found popular in the colleges. A warning voice is raised against the high pressure at which girls live both at work and pleasure, and the necessity of more regular rest and exercise is insisted upon. A large part of the Circular consists of plans and elevations of gymnasiums, useful to both schoolmasters and architects.

THE labours of a curator who undertakes the first setting in order of the raw material of a museum in a new building are fully disclosed in the Report of the Nottingham Free Natural History Museum, which published the works of Mr. J. F. Blake, the Superintendent. And it can be no small labour to which he has devoted himself, even though extending over five years; comprising, as it does, the naming and re-naming of 11,400 specimens of every class of natural production hitherto kept with very little care; the supplementing them, as opportunity offered, with important desiderata till the total number of objects exhibited has increased to 21,960; the preparation of maps showing the geographical distribution of the animals near which they are placed; the pictorial mounting of specimens of birds and of birds' nests; and the specially important duty of a local museum of getting together as complete a local collection as possible. At the same time we regard it as a most wholesome symptom in the case that Mr. Blake is by no means satisfied with his achievements, and we wish him more rapid progress in all his present and future undertakings on behalf of the Museum.

AMONG recent contributions to natural-history literature, attention is due to an interesting work by the eminent Norwegian naturalist, Leonhard Stejneger, published in the United States under the title of "Results of Ornithological Explorations in the Commander Islands and Kamtschatka." In this work, which is illustrated by coloured plates, the author describes upwards of 140 species, all of which were collected or observed by himself during his various visits to Behring's Sea and the neighbouring coast-lands and islands. The main results of these expeditions had previously appeared in the *Bulletins* of the U.S. National Museum, in the Ornithological Department of which institution Mr. Stejneger holds the post of Assistant Curator, while he has also from time to time supplied *Naturen* with pleasantly-written popular reports of his voyages and observations, and to these we have more than once had occasion to make favourable reference. As, however, both these sources are inaccessible to the general reader, we welcome with great satisfaction the present comprehensive English exposition of Mr. Stejneger's most recent contributions to the branch of science which he so successfully cultivates. Within his own province he has, moreover, been doing good service to popular science as compiler of the ornithological portion of the American "Standard Natural History," published at Boston by Messrs. Cassino and Co. In Mr. Stejneger's original contributions to this work, which claims to be based on the most recent results of science, he has been able by his own observations to make various additions to, and corrections of, the statements of Brehm, who has hitherto been trusted as our principal authority regarding North European and American ornithology.

DURING a severe thunderstorm which passed over Central Norway last week a remarkable example of the power of lightning was witnessed. In a field at Löiten a fir-tree 80 feet in height was struck by lightning some 12 feet from the ground, with the effect that the tree was cut in halves and the upper portion—about 60 feet in length—thrown a distance of several yards. The most curious part, is, however, that the surface of the detached part is as smooth as if the tree had been sawn through, whilst that of the stump remaining in the ground is jagged, charred, and splintered to the root. The ground around the tree is furrowed in all directions, one being several feet in width and depth, and extending for some 10 yards. A spruce-tree close by shows a furrow an inch in width running from a height of 6 feet down to the root.

ON Thursday night, at 11.30, M. L'Hoste crossed from Cherbourg in a balloon, alighting in the neighbourhood of London at 6.30 on Friday morning. M. L'Hoste had a small sail to assist in directing the balloon, and an apparatus for letting down into the sea to draw water into the balloon to act as ballast. He was accompanied by M. Mangot, the astronomer. The highest altitude attained was 3600 feet, and the lowest temperature observed 7° C.

THE additions to the Zoological Society's Gardens during the past week include a Malbrouck Monkey (*Cercopithecus cynosurus*) from West Africa, presented by Mrs. Barrington; a Blue-faced Amazon (*Chrysotis æstiva*) from Brazil, presented by Mrs. J. Fletcher; an Aldrovandis Skink (*Plestiodon auratus*) from North Africa, presented by Mr. R. J. M. Teil; two Grey Parrots (*Psittacus erithacus*) from West Africa, deposited; a Sea Eagle (*Haliaetus* ——), a Masked Weaver Bird (*Hyphantornis personata*) from Africa, a Short-eared Owl (*Asio brachyotus*), European, a Hyacinthine Macaw (*Ara hyacinthina*) from North Brazil, two Blanding's Terrapins (*Clemmys blandingi*) from North America, two Indian River Snakes (*Tropidonotus quincunciatus*) from India, purchased; two Triangular Spotted Pigeons (*Columba guinea*), a Geoffroy's Dove (*Peristera geoffroii*), four Brazilian Teals (*Querquedula brasiliensis*), five Slender Ducks (*Anas gibberifrons*), two Chilian Pintails (*Dafila spinicauda*), two Wild Ducks (*Anas boschas*), a Himalayan Monaul (*Lophophorus impeyanus*), bred in the Gardens.

ASTRONOMICAL PHENOMENA FOR THE WEEK 1886 *AUGUST* 8–14

(FOR the reckoning of time the civil day, commencing at Greenwich mean midnight, counting the hours on to 24, is here employed.)

At Greenwich on August 8

Sun rises, 4h. 37m.; souths, 12h. 5m. 25·3s.; sets, 19h. 34m.; decl. on meridian, 16° 6′ N.: Sidereal Time at Sunset, 16h. 43m.

Moon (two days after First Quarter) rises, 14h. 45m.; souths, 19h. 25m.; sets, 0h. 1m. ; decl. on meridian, 16° 41′ S.

Planet	Rises h. m.	Souths h. m.	Sets h. m.	Decl. on meridian ° ′
Mercury	6 10	12 51	19 32	7 24 N.
Venus	1 57	10 3	18 9	22 4 N.
Mars	10 51	16 11	21 31	8 41 S.
Jupiter	9 5	15 7	21 9	0 25 S.
Saturn	1 58	10 4	18 10	22 4 N.

* Indicates that the setting is that of the following morning.

Variable Stars

Star	R.A. h. m.	Decl. ° ′		h. m.	
U Cephei	0 52·2	81 16 N.	Aug. 12,	21 49	*m*
R Arietis	2 9·6	24 31 N.	,, 12,		*M*
T Ursæ Majoris	12 31·2	60 7 N.	,, 10,		*m*
U Virginis	12 45·3	6 10 N.	,, 10,		*m*
R Camelopardalis	14 26·3	84 21 N.	,, 11,		*M*
δ Libræ	14 54·9	8 4 S.	,, 14,	20 30	*m*
S Libræ	15 14·9	19 59 S.	,, 12,		*M*
U Ophiuchi	17 10·8	1 20 N.	,, 12,	2 10	*m*
			,, 12,	22 18	*m*
U Sagittarii	18 25·2	19 12 S.	,, 12,	0 0	*m*
β Lyræ	18 45·9	33 14 N.	,, 8,	0 0	m_2
R Lyræ	18 51·9	43 48 N.	,, 13,		*m*
η Aquilæ	19 46·7	0 43 N.	,, 13,	2 0	*m*
δ Cephei	22 24·9	57 50 N.	,, 11,	0 0	*M*

M signifies maximum; *m* minimum; m_2 secondary minimum.

Meteor Showers

The principal shower of the week is that of the *Perseids*, R.A. 43°, Decl. 56° N. The maximum occurs on August 10, but many meteors from the same radiant are usually seen on the nights both immediately preceding and following that date. Meteors are frequently seen also from neighbouring radiants, *e.g.* near the Pleiades, R.A. 55°, Decl. 26° N.; near Capella, R.A. 68°, Decl. 46° N.; near ν Tauri, R.A. 55°, Decl. 7° N.; and from Lynx, R.A. 96°, Decl. 71° N. A radiant from α Pegasi, R.A. 345°, Decl. 15° N., is also active at this season, which is usually the most prolific of the year.

Occultations of Stars by the Moon (visible at Greenwich)

Aug.	Star	Mag.	Disap. h. m.	Reap. h. m.	Corresponding angles from vertex to right for inverted image ° °
8	24 Scorpii	5	19 15	20 34	92 255
11	*d* Sagittarii	5	18 44	20 0	74 242

Aug.	h.	
8	14	Venus in conjunction with and 0° 1′ south of Saturn.

THE SCIENTIFIC DEVELOPMENT OF THE COAL-TAR COLOUR INDUSTRY[1]

THE subject on which I propose to address you this evening has been brought under the notice of the Society of Arts on former occasions, and was only last year thoroughly treated of by Dr. W. H. Perkin, the pioneer of this branch of manufacture, in his Presidential Address to the Society of Chemical Industry. It has, moreover, quite recently furnished materials for a lecture at the Royal Institution by Sir Henry Roscoe, so that I feel in some measure obliged to apologise for again bringing forward a topic upon which it may appear to chemists that nothing particularly new remains to be said. Having, however, been intimately associated with this branch of chemical industry for many years, I have had exceptional opportunities of watching its development, and of forming ideas upon the causes of its progress, which may justify my engaging your attention upon the present occasion.

The manufacture of coal-tar products is a subject which offers distinct advantage for popular treatment, both on account of the practical utility of the products, and the striking and beautiful colour phenomena which they present. But I do not propose now to avail myself of these advantages, because I think there is a more serious aspect of the subject than the mere enumeration of the names, chemical formulæ, and mode of preparation of the recently discovered products. I must take it for granted that those present this evening are familiar with the fact that out of coal-tar there are obtained series of hydrocarbons from which are prepared nearly all the dye-stuffs at present in use; that the introduction of these artificial colouring-matters has revolutionised the tinctorial industries, and that the tar of gas-works, which was formerly a waste product and a nuisance, is now a valuable source of revenue to the gas companies. It is, doubtless, known to you also that, besides colouring-matters, there are obtained from the same hydrocarbons artificial perfumes, and drugs which rival quinine in efficiency; and that quite recently a substance has been discovered by Dr. Fahlberg, which goes by the name of "saccharine," and which is stated to possess 220 times the sweetening power of cane sugar.[2] But I must content myself by merely pointing to such discoveries as triumphs which the chemist, by his "so potent art," has achieved in recent times, because I want to bring home to English manufacturers one particular point in connection with this industry, and the Chemical Section of the Society for the Encouragement of Arts, Manufactures, and Commerce seems to me to be the right place for so doing. It cannot be denied that the coal-tar industry has for some years past been migrating from this country, the land of its birth, to the continent of Europe. Of the causes of this decline assigned by Dr. Perkin and others who have expressed opinions upon the subject, I do not now propose to touch upon those which may be considered as purely politico-economical

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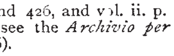
[1] A Paper read at the Society of Arts by Prof. R. Meldola, F.R.S., F.C.S., F.I.C., on May 13, 1886.

[2] The substance referred to is an anhydro-derivative of orthosulphaminebenzoic acid having the formula



$$C_6H_4 < \begin{matrix} CO \\ SO_2 \end{matrix} > NH.$$

For details, see a paper by I. Levinstein, *Journ.* Soc. Chem. Ind., Feb. 1886, p. 75. Also the original communications in the *American Chemical Journal*, vol. i. pp. 170 and 426, and vol. ii. p. 181. For an investigation of the physiological action see the *Archivio per le scienze mediche*, vol. ix. No. 22, p. 407 (Turin, 1886).